GEORGIA TECH   SCHOOL OF MATHEMATICS

CALCULUS II
Quiz # 10
November 12th 2007

First Name : _____

Last Name : _____

Section & TA's name : _____

1. Let $A = \begin{bmatrix} 1 & 4 & 2 & 1 \\ 2 & 3 & 1 & 1 \\ 3 & 2 & 4 & 0 \\ 4 & 1 & 3 & 0 \end{bmatrix}$

   (Use back pages for your calculation)

   (a) Compute the rank of A

$$\text{rank}(A) \; = $$

   (b) Give a basis for $\text{Im}(A)$

$$\text{Basis of } \; \text{Im}(A) \; :$$

(c) Give a basis for Ker(A)

Basis of Ker(A) :

_____

(Start your calculations below)

(Use this page for your calculations)

2. Let $\mathbf{v}_1 = \begin{bmatrix} 1 \\ -1 \\ 0 \\ 2 \end{bmatrix}$, $\mathbf{v}_2 = \begin{bmatrix} 1 \\ 0 \\ -1 \\ 3 \end{bmatrix}$, $\mathbf{v}_3 = \begin{bmatrix} 0 \\ 1 \\ 1 \\ 4 \end{bmatrix}$. Are they linearly independent ?

$\qquad\qquad\qquad$ *YES* □ $\qquad\qquad\qquad$ *NO* □

Justification :

(Use this page for your calculations)

3. Let $A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$ and $\mathbf{b} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$. Find the least square solution of

$A\mathbf{x} = \mathbf{b}$

$\mathbf{x}_0 \; = $

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(Start your calculations below)

(Use this page for your calculations)